

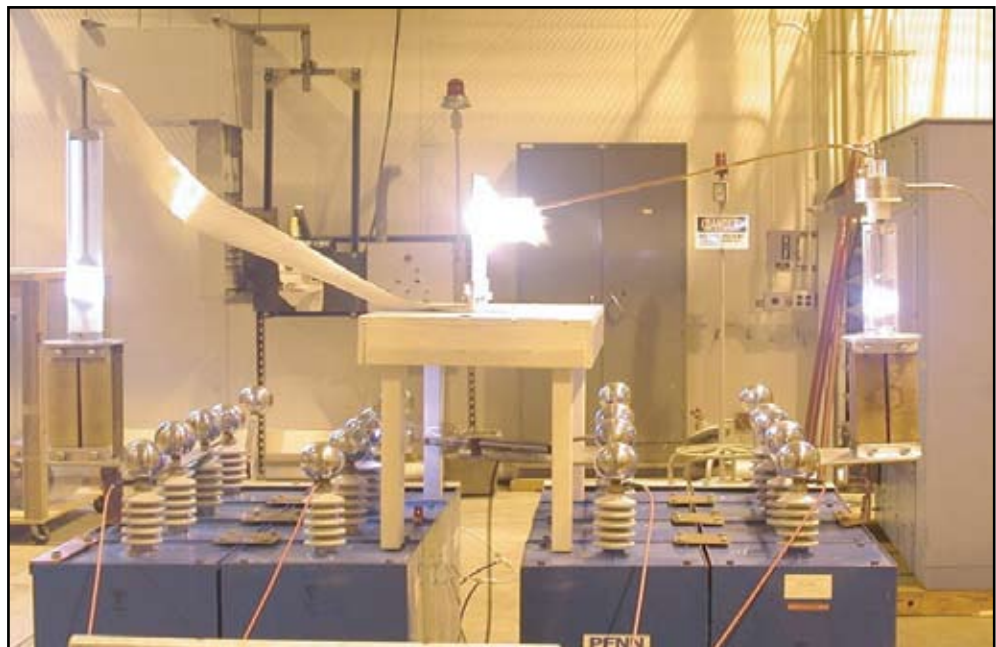


Air Force Research Laboratory|AFRL

Science and Technology for Tomorrow's Air and Space Force

Success Story

AFRL PROVIDES SOLUTIONS FOR C-17 LIGHTNING STRIKE PROTECTION



AFRL provided solutions for lightning attachment event mitigation and damage repairs for the C-17 transport aircraft. AFRL used its pulse current generator facility to deliver impulse currents of approximately 20,000 amps peak amplitude to C-17 prototype structures. AFRL's unique facilities and expertise provided a rapid and cost-effective evaluation of various nanomaterial-based composite solutions to the C-17 lightning attachment problem.



Air Force Research Laboratory
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Accomplishment

AFRL developed specialized composite panels that employ nanomaterials in their fabrication. Each prototype carbon composite panel has its own unique construction, with an emphasis on using layers of nanofilamentary metals, metal coated carbon nanotubes, and nickel nanostrand veils. Prior to testing the panels' high-current impulse, the laboratory accomplished full characterization of surface and subsurface morphology for each prototype. AFRL employed its unique pulse current generator facility to deliver impulse currents of about 20,000 amps peak amplitude in an effort to simulate attachment events on the prototype panels. Laboratory personnel reconfigured the impulse test facility and designed customized panel mounts to simulate the lightning attachment event.

Background

The aircraft's current hybrid composite material design utilizes an embedded conductive copper mesh that provides a level of lightning strike survivability; however, repairing lightning attachment sites in the field is a difficult task, and the repair process does not ensure maintained electrical bond continuity. Scientists typically use the pulse current generator to perform research and characterize transient magnetic fields, which result from the operation of advanced directed energy weapons on flight vehicles. AFRL manages and executes research and advanced development programs in power generation and systems integration technologies.

Propulsion
Support to the Warfighter
Air (Sustainment)

Additional Information

To receive more information about this or other activities in the Air Force Research Laboratory, contact TECH CONNECT, AFRL/XPTC, (800) 203-6451 and you will be directed to the appropriate laboratory expert. (05-PR-14)